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BRACHYMELES, A GENUS OF PHILIPPINE LIZARDS

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ONE PLATE AND SEVEN TEXT FIGURES

The genus *Brachymeles*, as here understood, is the same as defined by Boulenger;¹ that is, it includes the genera *Brachymeles* Dumeril and Bibron and *Senira* Gray. At first glance the three large pentadactyl species—*B. schadenbergi*, *gracilis*, and *bicolor*—appear to be very different from the diminutive *bonitæ* with stumplike limbs; however, the marked similarity of the upper head scales and the fact that these species form a more or less continuous series warrant placing them in one genus. The recent discovery of two species intermediate between *bicolor* and *bonitæ* makes the relationship of the species appear more obvious.

Taking *Brachymeles schadenbergi* as the most specialized form of the genus, since in this species the leg development seems greatest (that is, the length of the hind leg is contained in the axilla to groin distance 3.25 times,² while in *B. gracilis* the average is 3.6 times),³ it is seen that the relative length of the body (axilla to groin distance) increases and the length and the development of the limbs decrease proportionally in each species of the series. Thus in *B. bicolor* the hind leg is contained in the axilla to groin distance 7 times; in *eleræ*, 9.6 times; in *bonitæ* and *burksi*, more than 25 times.

¹ Cat. Liz. Brit. Mus. (1887), 3, 386.

² Average of 20 specimens.

³ Average of 27 specimens.

In the two species first mentioned, which are very closely related, the legs are used more or less; in *bicolor* the legs are for the most part kept folded close to the body and are probably of no great consequence in locomotion; however, the limbs are still pentadactyl. In *eleræ* the limbs are still further reduced and one of the digits on each hand and foot is wanting; in this species the legs are probably of no use in locomotion. In *bonitæ* and *burksi* the legs are reduced to small stumplike rudiments and are scarcely more than 2 millimeters long in the largest specimens.

In this paper I have redescribed the species of the genus from large series of specimens. The characters assigned to *B. gracilis* and to *B. schadenbergi* by Boulenger⁴ are not constant, and specimens of one species can be found that agree with both descriptions. Of the two new species here described, *B. eleræ* is well differentiated by having only four digits; *B. burksi* stands in the same relation to *B. bonitæ* as *B. schadenbergi* does to *B. gracilis*.

Key to the species of Brachymeles.

- a¹. Limbs pentadactyl.
 - b¹. Length of hind leg contained three to four times in the distance between axilla and groin.
 - c¹. Second pair of chin shields broader than first and separated by one scale *gracilis* Fischer.
 - c². First pair of chin shields broader than second pair, the latter separated by two or three scales..... *schadenbergi* Fischer.
 - b². Length of hind leg contained about seven times in distance from axilla to groin. First pair of chin shields broadest; second pair separated by two or more scales. Limbs pentadactyl..... *bicolor* Gray.
- a². Limbs tetradactyl. Length of hind limb contained nine to ten times in distance from axilla to groin; second pair of chin shields broadest, separated by one scale..... *eleræ* sp. nov.
- a³. Limbs stumplike. Limbs contained in axilla to groin distance twenty-five or more times.
 - d¹. Second pair of chin shields broadest, separated by a single scale.
 - burksi* sp. nov.
 - d². First pair of chin shields broadest; second pair separated by three scales *bonitæ* Dumeril and Bibron.

Brachymeles schadenbergi Fischer. Plate I, fig. 1.

Senira bicolor, part., GRAY, Cat. Liz. Brit. Mus. (1845), 98.

Eumeces (Riopa) schadenbergi FISCHER, Jahrb. Wiss. Anst. Hamb. (1885), 11, 87, Pl. III, fig. 2.

Brachymeles schadenbergii BOULENGER, Cat. Liz. Brit. Mus. (1887), 3, 386.

⁴ Boulenger, op. cit., 386.

Description of species.—Rostral large, longer than wide, pointed behind, in contact with the frontonasal in 7 specimens, separated in 13; supranasals present, either in contact or separated; frontonasal usually broader than wide; prefrontals constantly separated, leaving frontal narrowly in contact with frontonasal; frontal large, longer than broad or equal, constantly in contact with two supra-oculars; frontoparietals

usually in contact (two specimens show exception), as broad as long or a little broader; interparietal large, longer than broad, with a whitish eyespot; parietals not forming a suture behind interparietal (one exception); no nuchals; nostril pierced in a small nasal, which is followed by a small postnasal; two frenals, first much higher than wide; second lower than first and nearly square; two small preocular scales; five supra-oculars, the second widest; six superciliaries;

six or seven upper labials, the fourth entering the orbit (two specimens have the fifth), first largest; four subequal scales at the posterior corner and below the eye; temporal scales slightly enlarged; mental large, somewhat rectangular; five to seven, usually six, lower labials; an undivided postmental wider than deep; first pair of chin shields wider than second pair, in contact or not (10 specimens touch, 10 do not); rostral, mental, first upper and lower labials, nasals, postnasals, and internasals all apparently thickened and lighter in color than body; eye small, its diameter one half its distance from snout; distance from eye to auricular opening greater than from eye to nostril; auricular opening present, small, about halfway between end of snout and insertion of forearm; forearm pressed forward fails to reach auricular opening in large specimens, but does so in some smaller specimens; foreleg followed by a lateral depression into which it is usually folded; distance from tip of snout to insertion of arm from 2 to 2.6 times (average, 2.3) in distance from axilla to groin; length of hind leg contained in this distance from 3 to 4 (average, 3.25). Limbs pentadactyl; with unicarinate lamellæ; six lamellæ under longest finger, eight under longest toe; third and fourth toes practically equal, sometimes the fourth slightly longer, sometimes the third; preanal scales slightly enlarged; 26 to 28 rows of scales about the body (17 specimens, 28 rows; 3 specimens, 26 rows); scales of posterior part of body frequently dimly tricarinate; tail 1.1 times the length of body.

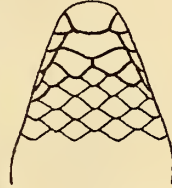


FIG. 1. *Brachymeles schadenbergi*
Fischer, chin shields. $\times 2$.

Color in life.—Above brown, each scale with a darker brown area, covering eight scale rows; laterally and ventrally brownish yellow with some lateral scales flecked with the darker brown of the dorsal area; scales of belly of some specimens flecked with brown; scales on the ventral part of tail usually dark brown; head and upper labials usually dark brown, scales on the end of snout lighter.

Measurements of Brachymeles schadenbergi Fischer.

	Largest specimen. mm.	Average of 5 nearly equal-sized specimens. mm.
Length	220	206
Snout to vent	112	99
Tail	^a 108	106
Snout to foreleg	31	29
Axilla to groin	71	64
Foreleg	13	12.5
Hind leg	20	19

^a Tip missing.

Remarks.—This species is common in Mindanao. Most of the specimens examined are from Agusan River Valley. It is a burrowing form and is usually found under logs or trash. The females give birth to from two to five young.

The preceding description is based on a series of 20 specimens from Mindanao.

Brachymeles gracilis Fischer. Plate I, fig. 2.

Senira bicolor, part., GRAY, Cat. Liz. Brit. Mus. (1845), 98; GÜNTHER, Proc. Zool. Soc. London (1879), 76.

Eumeces (Riopa) gracilis FISCHER, Jahrb. Wiss. Anst. Hamb. (1885), 11, 85, Pl. III, fig. 1.

Brachymeles gracilis BOULENGER, Cat. Liz. Brit. Mus. (1887), 3, 387.

Description of species.—Rostral broader than high, visible above; supranasals present, in contact or not behind the rostral (8 specimens touch, 19 do not); frontonasal broader than deep; prefrontals broader than deep, never in contact with each other, laterally forming sutures with both frenals and first superciliary; frontal large, about as long as broad, in contact with the frontonasal and two supra-oculars; frontoparietals constantly in contact, about as broad as deep; parietals elongate, in contact or not behind the interparietal (14 specimens touch, 13 do not); interparietal about as long as broad with a distinct white eye-spot; nostril in a minute nasal followed by a postnasal; two frenals, first highest, second rather square; five or six supercilia-ries; five supra-oculars, second widest; six or seven upper labials,

fourth entering orbit; seven lower labials, mental little wider than deep, followed by an undivided postmental much wider than deep; first pair of chin shields in contact or not (19 specimens touch, 8 do not); second pair of chin shields broadest, separated by a single scale; temporals not or but slightly enlarged; pre-anals somewhat enlarged; foreleg short, with four unicarinate lamellæ under the longest finger; hind leg with third and fourth toes equal, eight lamellæ under each; a short depressed area along the body behind limbs; distance from eye to end of snout about equal to distance from eye to auricular opening; distance from snout to foreleg contained in distance from axilla to groin 2.1 to 2.6 times (average, 2.46); length of hind leg contained in axilla to groin distance 3 to 4.3 times (average, 3.6). The front leg fails to reach the ear by a considerable distance.

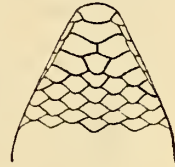


FIG. 2. *Brachymeles gracilis* Fischer, chin shields. $\times 2$.

Color in life.—The 10 or 12 upper rows of scales dark yellowish brown with darker spots, usually on the posterior part of each scale, forming, sometimes, rather distinct longitudinal lines; below usually dirty yellowish brown, each scale on ventral side of tail with a brownish spot; head blackish brown; sometimes scales on sides and belly have small dark spots. Scales smooth, in 24 to 28 rows.

Measurements of Brachymeles gracilis Fischer.

Length	mm.
Tail	196
Axilla to groin	101
Snout to foreleg	60
Foreleg	26
Hind leg	9
	15

Variation.—The young usually have narrow white stripes from behind the eyes to some distance on the tail, separated by six rows of scales. These frequently persist in half-grown specimens. One specimen from Canlaon Volcano, Negros, shows very marked variation from other specimens from the same locality. It has 30 rows of scales, the legs are better developed; the ear opening much larger and nearer the foreleg than the end of the snout; there is a broad white band on either side, the parietals are in contact; the fourth and fifth supralabials enter the orbit; the distance from snout to foreleg is contained twice in axilla to groin distance; the hind leg in the same distance, 2.7 times. It is probable that this specimen represents a distinct subspecies.

Remarks.—Females give birth to from four to six young at a time. Embryos taken from a female captured in Mindoro measured about 60 millimeters and were still surrounded by a large egg mass; the eyespot on the interparietal is prominent in the embryos.

This species is common in Negros and is especially common in Mindoro. I was unable to find it in Mindanao where it has been reported by J. G. Fischer.⁵ I surmise that the specimen reported by Fischer is *B. schadenbergi*. The preceding description is based on a series of 27 specimens from Negros and Mindoro.

Brachymeles bicolor Gray. Plate I, fig. 3.

Senira bicolor, part., GRAY, Cat. Liz. Brit. Mus. (1845), 98.

Brachymeles bicolor BOULENGER, Cat. Liz. Brit. Mus. (1887), 3, 388, Plate XXXI. CASTO DE ELERA, Fauna de Filipinas (1895), 422.

Description of species.—Rostral very much broader than deep, not touching the frontoparietal; internasals large, broadly in contact behind the rostral and forming their longest suture with the frontonasal; latter much broader than deep, in contact with one loreal and in contact with the frontal at a single point; prefrontals large, minutely separated, wider than deep; frontal longer than wide, rather pointed in front, touching two supraoculars; two frontoparietals, a little wider than deep, broadly in contact behind frontal; two very elongate parietals, lying diagonally, nearly three times as long as wide, forming a suture behind interparietal; latter longer than broad; a pair of nuchals, narrow and elongate; a large, elongate temporal borders parietal; nasal extremely small, only a ring about nostril; a postnasal of nearly the same

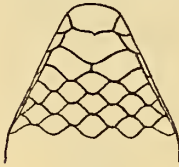


FIG. 3. *Brachymeles bicolor* Gray, chin shields. $\times 2$.

size; two large frenals, first higher than wide, higher than second; second frenal nearly square; a preocular directly in front of eye; five supra-oculars, second longest and arranged as in other members of the genus, two in contact with frontal; a few small scales below orbit above labials; six superciliaries; six upper labials, first largest, not touching internasal; fourth under eye, first four of nearly the same size; two or three scales in temporal region enlarged; six lower labials; mental broader than deep, rather rectangular; postmental single, wider than deep; first pair of chin shields in contact, wider than second pair; the latter small, separated by three scales (like the arrangement in *B. schadenbergi*). Ear opening greatly reduced and well poste-

⁵ Fischer, loc. cit.

rior to eye; 28 rows of scales around the body; anals not or scarcely enlarged. Legs small, five fingers and toes present, all clawed; lamellæ below digits feebly compressed and uncarinate, limbs rather broadened at base. Hind leg contained in the distance from axilla to groin 7.4 times.

Color in alcohol.—Above dark red-brown, covering ten scale rows; each scale with a darker brown spot, which is not readily discerned; head and upper parts of limbs brown; laterally and ventrally the color is yellowish to brownish white, distinctly contrasted with the color above.

Measurements of Brachymeles bicolor Gray.

	mm.
Length, tail broken and a partial regeneration begun	215
Snout to vent	155
Width of body	18
Width of head	14
Snout to ear	15
Snout to eye	6
Snout to foreleg	32
Axilla to groin	112
Foreleg	8
Hind leg	15

Remarks.—The specimen contained two embryos which were almost fully matured. They measure 90 and 86 millimeters, respectively; width of head, 6.5; snout to vent, 48; hind limb, 6. The head scales are identical with those of the mother, save that the interparietals are a little wider than deep; the nuchals are present in one specimen, in the other they are broken. I regard the presence of the nuchals as a normal characteristic, although the figure of the type does not show them. This species is apparently very rare. I have been unable to find it, and there is no specimen in the Bureau of Science collection. I am inclined to believe that it is an inhabitant of north-central and western Luzon, although I have been unable to find any definite localities recorded. It is the largest known species of the genus and is readily recognized by the elongate body.

Described from a specimen in the Santo Tomas Museum, Manila. It has no number. It is labeled "Filipinas."

Brachymeles eleræ sp. nov. Plate I, fig. 4.

Type.—Museum of Santo Tomas, unnumbered; the collector unknown; labeled "Filipinas."

Description of type.—Rostral but little wider than deep, bending backward somewhat over end of the snout, broadly in contact with frontonasal; internasals reduced, separated, in contact with

first labials; frontonasal nearly as long as broad, narrowly in contact with frontal; the latter longer than broad, produced to a point in front, in contact with two supra-oculars; frontoparietals quadrangular, moderate, separate; frontal touches interparietal, which is diamond-shaped; parietals elongate, three times as long as wide; nasal minute, a mere rim around nostril; two frenals, first higher than wide; second almost square; one large preocular; five supra-oculars, the second widest; six superciliaries; six labials above, first labial largest, the fourth entering orbit; one pair of nuchals; temporals somewhat enlarged, the largest bordering parietal; mental quadrangular, wider than deep; one postmental, wider than deep; first and second pairs of chin shields divided by a single, median, much-enlarged scale, second pair somewhat broader than first pair; third pair of chin shields divided by three scales. Limbs much reduced, each with four diminutive, clawed digits; ear opening wanting; two anals distinctly enlarged; eye rather small; 24 scale rows around anterior part of body; 22 about middle; length of hind leg in distance from axilla to groin about ten times.

Color in alcohol.—Very light yellowish brown above and on sides, each scale with a dark brown spot, which forms longitudinal dotted lines on each scale row; dots below smaller and not so distinct as above.

Measurements of Brachymeles eleræ sp. nov.

	Type. mm.	Cotype. mm.
Length	128	103
Snout to vent	68	63
Width of body	6	6
Width of head	5.1	5
Axilla to groin	51	44
Snout to foreleg	15	12
Foreleg	3.5	3.1
Hind leg	5.2	4.6
Scale rows	22-24	24-26

Variation.—A second specimen in Santo Tomas Museum is in the same container and is probably from the same locality. Its measurements are included in the preceding table.

The two specimens agree very well, save that in the cotype the scale dividing the first pair of chin shields is smaller and the



FIG. 4. *Brachymeles eleræ* sp. nov., type; chin shields. $\times 2$.



FIG. 5. *Brachymeles eleræ* sp. nov., cotype; chin shields. $\times 2$.

second pair is divided by only a single scale. This is probably the normal condition.

Remarks.—While no locality is given, I am assured by the Director of Santo Tomas Museum that the specimens are from Nueva Vizcaya. I take pleasure in naming the species for Father Casto de Elera in recognition of his contribution to Philippine zoölogy.

Superficially this species resembles *Lygosoma lineatum* Gray and thus the specimens were found labeled. In common with this species they have four digits on the limbs, and the coloring and the marking are strikingly similar, but here the resemblance ceases. It has no close affinities in the genus.

Brachymeles burksi sp. nov. Plate I, fig. 5.

Type.—No. 700, male, private collection; collected at Sumagui (Liddell Plantation), east coast of Mindoro; May 4, 1916; by E. H. Taylor.

Description of type.—General appearance rather wormlike; head bluntly pointed. Rostral large, visible above for nearly half its length, rather broadly in contact with the frontonasal; nostril in a minute nasal between first labial, supranasal, and rostral; supranasal in contact with largest frenal and first labial; these scales on point of snout thickened; frontonasal a little broader than long, narrowly in contact with frontal, which is slightly longer than broad and in contact with first and second supra-oculars; prefrontals rather rectangular, touching two frenals, first superciliary, and first supra-ocular; four supra-oculars, second widest, last smallest; four or five superciliaries; frontoparietals somewhat rectangular, little larger than prefrontals, touching two supra-oculars; interparietal a little longer than broad, narrowly in contact with the frontal; parietals more than twice as long as wide, in contact behind interparietal, touching two supra-oculars, two temporals, and an elongate nuchal; two frenals, a small preocular before eye; no postnasal; six upper labials, fourth entering orbit; six lower labials; mental moderate, thickened, wider than high; an unpaired postmental, followed by three pairs of chin shields none of which are in contact, second pair widest; two temporals between parietal and sixth labial; 24 scale rows; two distinctly enlarged preanals; eyes small; ear completely hidden; legs reduced to scaled stumplike rudiments with no indication of digits; length from snout to foreleg 4.5 times in distance between axilla and groin.



FIG. 6. *Brachymeles burksi* sp. nov., chin shields. $\times 2$.

Measurements of *Brachymeles burksi* sp. nov.

	mm.
Length, tail regenerated	103
Snout to anus	73.5
Axilla to groin	60
Snout to foreleg	13.5
Width of head	4.5
Width of body	5.4
Foreleg	1.1
Hind leg	1.3

Color in life.—Above and below dark (sometimes purplish) brown, each scale having a darker area with the edges somewhat lighter; end of snout grayish.

Remarks.—Several specimens of this species were taken on the eastern coast of Mindoro at Sumagui, on the Liddell Plantation; ten specimens were taken later at Calapan, on the northern coast. They were found burrowing under logs and in rotting wood. Very little variation is evident; most of the specimens have 22 instead of 24 scale rows; one specimen has only five upper labials, the third entering the orbit. The females give birth to two young. Embryos taken from one female measured 56 and 54 millimeters; they seem almost entirely developed.

This species is closely related to *Brachymeles bonitæ*, but differs from it in the following characters: The leg stumps are even more reduced, the prefrontals and frontoparietals are smaller, nuchals are present, the mental is much smaller, and the postmental is in contact with two instead of one labial, the second pair of divided chin shields are broader than the first pair and are separated by a single scale.

I take pleasure in naming this species for Mr. Clark Burks, who assisted in making collections in western Mindoro.

Brachymeles bonitæ Dumeril and Bibron. Plate I, fig. 6.

Brachymeles bonitæ DUMERIL and BIBRON, *Erp. Gén.* (1839), 5, 777; GRAY, *Cat. Liz. Brit. Mus.* (1845), 98; BOETTGER, *Bericht. ü. d. Senck. Nat. Gesel.* (1886), 103; BOULENGER, *Cat. Liz. Brit. Mus.* (1887), 3, 388.

Description.—Rostral large, triangular, about as high as wide; internasals present, large, separated; frontonasal large, a little wider than long, in contact laterally with a single frenal, forming sutures with rostral and frontal; prefrontals separated, in contact laterally with two frenals and first superciliary; frontal about as broad as long, in contact with two supra-oculars and narrowly with interparietal; frontoparietals rather large, separated;

parietals about three times as long as wide, forming a suture behind interparietal; nostril pierced in a minute nasal; no post-nasal; first labial in contact with internasal, two enlarged frenals; five supraciliaries, four supra-oculars, second widest; six supralabials, third and fourth entering orbit; temporals enlarged, nuchals slightly enlarged; mental large, followed by an enlarged postmental, which is in contact with a single lower labial; four pairs of divided chin shields, first largest and widest; fourth pair very small; ear hidden; limbs reduced to stumps with no digits; 26 rows of scales about body; eye small; scales on point of snout thickened; length of legs twenty-eight times in axilla to groin distance.

Color in life.—Uniform purplish brown, lighter on throat and chin. Scales on snout lighter than other head scales.

Measurements of Brachymeles bonitzæ Dumeril and Bibron.

	mm.
Length, tail regenerated	113
Length of head	9
Width of head	5.5
Axilla to groin	65
Foreleg	2.3
Hind leg	2.3
Snout to foreleg	13.5

Remarks.—This species stands much in the same relation to *B. burksi* as *B. schadenbergi* does to *B. gracilis*. The following differences are present: The mental is larger, the arrangement of the chin shields is essentially different, and the postmental is in contact with a single labial instead of with two as in *B. burksi*. Several other minor differences are evident on a comparison of the two species.

Described from No. 1151, private collection; Los Baños, Laguna, Luzon, on the side of Mount Maquiling, elevation about 100 meters; April 10, 1917; E. H. Taylor, collector.

NOTE: Since this paper has gone to press, two apparently new species of the genus *Brachymeles* have been discovered in the Sulu Archipelago. One is a pentadactyl form, the other has lost all external vestiges of limbs. They will be described in a forthcoming paper on Sulu reptiles.



FIG. 7. *Brachymeles bonitzæ*. Dumeril and Bibron, chin shields. $\times 2$.

ILLUSTRATIONS

[Photographs by Bureau of Science.]

PLATE I

- FIG. 1. *Brachymeles schadenbergi* Fischer.
2. *Brachymeles gracilis* Fischer.
3. *Brachymeles bicolor* Gray.
4. *Brachymeles eleræ* sp. nov.
5. *Brachymeles burksi* sp. nov.
6. *Brachymeles bonitæ* Dumeril and Bibron.

TEXT FIGURES

[Drawings by P. Moskaira.]

- FIG. 1. *Brachymeles schadenbergi* Fischer, chin shields. × 2.
2. *Brachymeles gracilis* Fischer, chin shields. × 2.
3. *Brachymeles bicolor* Gray, chin shields. × 2.
4. *Brachymeles eleræ* sp. nov., type, chin shields. × 2.
5. *Brachymeles eleræ* sp. nov., cotype, chin shields. × 2.
6. *Brachymeles burksi* sp. nov., chin shields. × 2.
7. *Brachymeles bonitæ* Dumeril and Bibron, chin shields. × 2.